

REMARKS

The Office Action of June 10, 2003 and the references cited therein have been carefully considered.

In this Amendment claim 1 has been amended to overcome the Examiner's formal objection to same, and to incorporate the limitations of claim 2, which has been cancelled.

In view of the amendment to claim 1, it is submitted that the objection thereto found in paragraph 1 of the Office Action has been overcome and should be withdrawn.

Reconsideration of the rejection of all of the pending claims, i.e., claims 1 and 3-7, under 35 USC 103(a) as being unpatentable over the patent to Morley et al. in view of the patent to Zutz is respectfully requested. In urging this ground of rejection, the Examiner has taken the position that the patent to Morley et al. discloses a slide ring seal assembly essentially comprising all of the features recited in claim 1, including the plurality of circumferentially spaced radially inwardly oriented extensions or projections that extend into recesses formed between lugs, on the radially outer surface of the leg, but does not disclose the circumferentially spaced recesses provided at the leg at the free axial end thereof with each recess extended from the radial axial surface to the radially inner surface, or that the inward oriented extensions of the annular sealing body project into respective recesses; that the patent to Zutz teaches the circumferentially spaced recesses provided in the leg of the slide ring surface with extensions of the

annular sealing body projecting into the recesses and with the recesses having an undercut which receives at least one of the extensions or projections of the annular ceiling body; and that consequently it would have been obvious to modify the axial leg of Morley et al. by including recesses and projections as taught by Zutz in order to improve adherence of the sealing body to the seal ring, and thus arrive at applicant's claimed invention. This conclusion reached by the Examiner is respectfully traversed. That is, it is initially submitted that the combination suggested by the Examiner would not be obvious to one skilled in the art from the teaching of the two references, and moreover that even if the combination of the teachings of the two references were combined, the resulting arrangement would not be the invention as defined in claim 1 as now amended, i.e., to incorporate the limitations of claim 2.

The patent to Morley et al. was cited and discussed in the present application in paragraph 5 beginning on page 4. The slide ring seal assembly disclosed in the Morley et al. patent, is generally similar to that disclosed in the present application, but suffers from a number of problems. A major problem of this slide ring assembly is that the sealing body 62 can lift off of the axial leg when the seal assembly is installed. As a result, a gap can form between the sealing body and the leg 114. While this reference does provide engaging teeth between the sealing body and the ring in order to attempt to prevent relative rotation, there is no recognition of the lifting problem and thus of any solution. This lifting problem, as well as a more secure prevention of relative rotation is

achieved according to the present invention as defined in claim 1.

According to the invention, the free end of the axially extending leg (6) of the angle shaped sealing ring is provided with a plurality of circumferentially spaced recesses that extend entirely through the leg, with at least one of the recesses continuing with an undercut (19) on the inner surface (13) of the axial leg (6 or 7). The annular sealing body (2 or 3) is provided with extensions or projections (14) which extend through the recesses of the leg and project into the undercuts (19) with an axial extension (26). As a result of this arrangement, including the extension and undercut, the sealing body cannot lift off the surface of the axial leg during the installation of the slide seal assembly. As a result, both protection against rotation in a circumferential direction and a protection against lifting off of the sealing body are created due to the special design of the recess (10) in conjunction with the special design of the sealing body (2 or 3), all as recited in claim 1.

As recognized by the Examiner, the arrangement of the recesses and the projections on the axially extending leg and the sealing body, respectively, are not taught by the Morley et al. reference. In order to attempt to overcome this deficiency, the Examiners applies the teachings of the Zutz patent, and in particular the teachings of this reference with regard to the sealing ring 2. The Examiner then takes the position that since the Zutz patent shows a particular manner of attaching a sealing element to an end of a slide ring, such teachings are applicable to the present invention and would suggest the combination advanced

by the Examiner. This position is respectfully traversed.

The patent to Zutz relates to a slide ring seal with a slide ring 1 and a slide ring 2, which can be axially braced relative to each other with an elastic sealing ring. Slide ring 1 is secured with the aid of O-ring 3 in a machine part 5. In this process, the O-ring is subjected to pressure stresses. On the other hand, the counter ring 2 has an elastic sealing ring 4 which is subjected to tension stresses. Note that the sealing ring 4 is immovably connected to the counter ring 2 by being vulcanized onto the counter ring 2. In this arrangement, an opening 7 is provided in the counter ring 2 through which the elastomeric material can flow for a better clamping effect for the vulcanization. Note that the sealing ring in this arrangement is connected to the counter ring 2 at a free radial end thereof, and the counter ring 2 has no axially extending leg, as is the case according to the present invention and in the primary reference to Morley et al., i.e., generally angled slide rings wherein the axial extending arm provides a seat of support for the sealing ring. Thus, in such arrangements, the forces and other considerations are entirely different, than that of a radial end of a leg as is the case for the rings of Zutz. Accordingly, it is submitted that one skilled in the art would not consider utilizing the arrangement of Zutz at the end of a counter ring with no axially extending arm and which is not in any way concerned with preventing relative motion, with a sealing ring of the type shown by Morley et al. to prevent rotation or to prevent lifting. Note that in the Zutz patent, the sole angled sealing ring 1 is not provided with any means to prevent a relative rotation, and the problem of rotation and/or

the problem of the lifting of the seal is not discussed in this patent. Accordingly, for these reasons, it is submitted that one would not consider combining the teachings of the Morley et al. and Zutz patents in the manner suggested by the Examiner, except through the use of hindsight in the light of applicant's disclosure.

Even if one would consider, for some reason, combining the references, it is submitted that the resulting structure would still not be that defined in the claims. In attempting to apply the teachings of the Zutz patent, the Examiner has taken the position that this reference teaches the claimed recesses with the undercuts as recited in claim 1. It is submitted, however, that this is not the case. The patent to Zutz simply states that in order to improve the adherence of the sealing ring 4 to the counter ring 2 by vulcanization, the counter ring 2 is provided with apertures 7 through which the elastomer material of the sealing ring 4 extends. The patent contains no further description of the openings or apertures or of any specific shape required for the apertures or openings other than that they are provided for improving adherence. While it is even questionable that the apertures of Zutz have any undercut, it is additionally clear that any incidental showing in a drawing without any disclosure thereof, particularly where the undercut according to the present invention performs a specific purpose, i.e., the lifting of the sealing ring from the slide ring, which function is not provided in the Zutz arrangement, cannot be considered to be a teaching of such a specific shape for a specific purpose. Note that with the recess, which continues into an

undercut extending in the axial direction according to the present invention, and with the axial projection on the inwardly oriented extensions of the annular sealing body, the sealing bodies can be inserted into the rings. Note that the Zutz reference does not teach either any undercuts or any extensions which extend in an axial direction, but simply incidentally shows a projection which widens at its inner end to prevent separation of the sealing body and the counter ring and to improve adherence during vulcanization. Accordingly, for this additional reason, it is submitted that claim 1 is allowable over the combination of the Morley et al. and Zutz references.

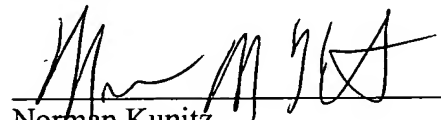
Claims 3-7 are each dependent on claim 1 and accordingly are allowable over the cited combination of references for at least the same reasons as that claim. Additionally, at least certain of these references contain additional limitations which are not taught, suggested or made obvious by the cited combination of references. For example, claim 3 recites that the outer radial surface at the free axial end of the axially extending leg as a circumferentially extending enlargement. With regard to this limitation, the Examiner has referred to the reference numeral 76 of Morley et al. Note that the enlargement according to the present invention provides support for the sealing ring extending through the recesses and into the undercut. Such is not the case with any enlargement of Morley et al. Claim 5 requires that there be two sealing rings, with two slide rings, as recited in claim 1. Note that the Zutz patent does not provide a sealing ring attachment for both slide rings, and in fact no arrangement for preventing

rotation of the slide ring 1 is provided. Accordingly, for these additional reasons, it is submitted that claims 3 and 5 are allowable over the cited combination of references under 35 USC 103.

In view of the above amendments, and for the above stated reasons, it is submitted that all of the pending claims, i.e. claims 1 and 3 to 7, are allowable over the prior art of record and are in condition for allowance. Such action and the passing of this application to issue therefore are respectfully requested.

If the Examiner is of the opinion that the prosecution of the application would be advanced by a personal interview, he is invited to telephone undersigned counsel and arrange for such an interview.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Norman Kunitz', is written over a horizontal line.

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